CLAIMS:

1.   A method for manufacturing a conductive composition comprising:

blending a polymer precursor with a single wall carbon nanotube composition; and

polymerizing the polymer precursor to form an organic polymer.

2.   The method of Claim 1 wherein the composition has an electrical bulk volume resistivity less than or equal to about 10^{12} ohm-cm, and a notched Izod impact strength greater than or equal to about 5 kilojoules/square meter.

3.   The method of Claim 1 wherein the composition has an electrical surface resistivity less than or equal to about 10^{12} ohm/square.

4.   The method of Claim 1, wherein the polymer precursor has the structure (I):
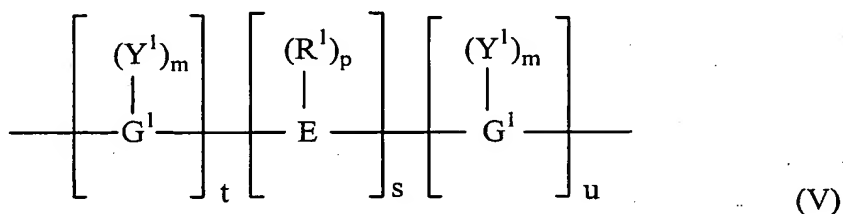

(I)
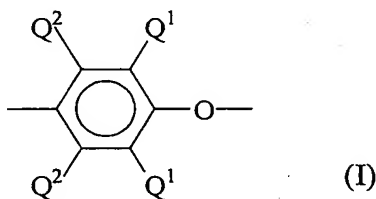
wherein for each structural unit, each Q^1 is independently hydrogen, halogen, primary or secondary lower alkyl, phenyl, haloalkyl, aminoalkyl, hydrocarbonoxy, halohydrocarbonoxy wherein at least two carbon atoms separate the halogen and oxygen atoms; and each Q^2 is independently hydrogen, halogen, primary or secondary lower alkyl, phenyl, haloalkyl, hydrocarbonoxy, halohydrocarbonoxy wherein at least two carbon atoms separate the halogen and oxygen atoms.

5.   The method of Claim 1, wherein the polymer precursors are 2,6-dimethylphenol and 2,3,6-trimethylphenol.

6. The method of Claim 1, wherein the organic polymer is the polymerization product of carbonyl compounds and dihydroxy compounds, wherein the dihydroxy compounds have the general formula (IV)

$$HO\text{---}A^2\text{---}OH \qquad\qquad (IV)$$

wherein A^2 has the structure of formula (V):

$$\left[\begin{array}{c} (Y^1)_m \\ | \\ \text{---}G^1 \\ \end{array} \right]_t \left[\begin{array}{c} (R^1)_p \\ | \\ E \\ \end{array} \right]_s \left[\begin{array}{c} (Y^1)_m \\ | \\ G^1\text{---} \\ \end{array} \right]_u \qquad (V)$$

wherein G^1 represents an aromatic group, E represents an alkylene, alkylidene group or a cycloaliphatic group, R^1 represents hydrogen or a monovalent hydrocarbon group, Y^1 is an inorganic atom, m represents any integer from and including zero through the number of positions on G^1 available for substitution; p represents an integer from and including zero through the number of positions on E available for substitution; t represents an integer equal to at least one; s is either zero or one; and u represents any integer including zero.
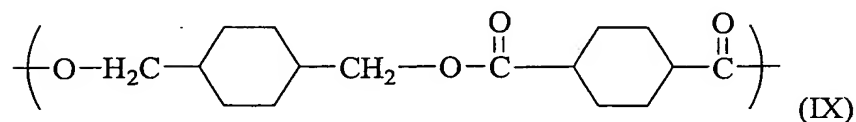
7. The method of Claim 1, wherein the organic polymer is a

polyester polymer having recurring units of the formula (VIII):

$$\left(O\text{---}R^3\text{---}O\text{---}\overset{\overset{\textstyle O}{\|}}{C}\text{---}R^4\text{---}\overset{\overset{\textstyle O}{\|}}{C} \right) \qquad (VIII)$$
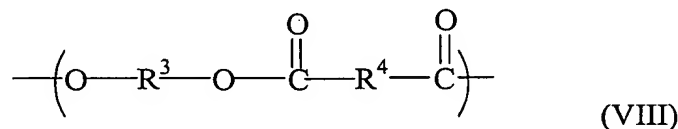
wherein R^3 represents an aryl, alkyl or cycloalkyl radical having greater than or equal to about 2 carbon atoms and which is the residue of a straight chain, branched, or cycloaliphatic alkane diol; and R^4 is an aryl, alkyl or a cycloaliphatic radical.
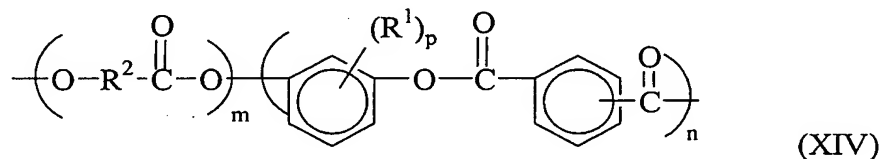
8.   The method of Claim 7, wherein the polyester is the polymerization product of a diol or diol chemical equivalent with a diacid or diacid chemical equivalent.

9.   The method of Claim 7, wherein the polyester is poly(1,4-cyclohexane- dimethanol-1,4-cyclohexanedicarboxylate) having recurring units of formula (IX)


$$(IX)$$

10.   The method of Claim 7, wherein the polyester is the polymerization product of an aromatic dicarboxylic acid with a bisphenol.

11.   The method of Claim 1, wherein the organic polymer comprises structural units of the formula (XIV)

$$(XIV)$$

wherein each R^1 is independently halogen or C_{1-12} alkyl, m is at least 1, p is up to about 3, each R^2 is independently a divalent organic radical, and n is at least about 4.

12.   The method of Claim 1, wherein the organic polymer is the polymerization product of a polymer precursor of the formula (XV):


$$(XV)$$
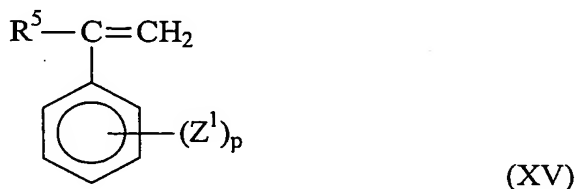
wherein R^5 is hydrogen, lower alkyl or halogen; Z^1 is vinyl, halogen or lower alkyl; and p is from 0 to about 5.

13. The method of Claim 1, wherein the organic polymer is a copolymer of styrene.

14. The method of Claim 1, wherein the organic polymer is a polyimide having the general formula (XVI)


(XVI)
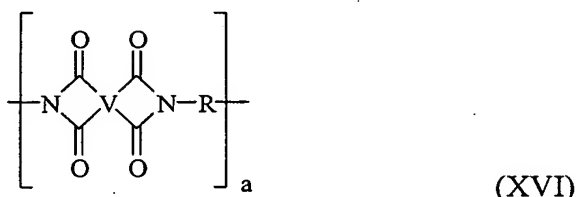
wherein a is greater than or equal to about 1; and wherein V is a tetravalent linker comprising (a) substituted or unsubstituted, saturated, unsaturated or aromatic monocyclic and polycyclic groups having about 5 to about 50 carbon atoms, (b) substituted or unsubstituted, linear or branched, saturated or unsaturated alkyl groups having 1 to about 30 carbon atoms; or combinations of the foregoing tetravalent linkers; R is a substituted or unsubstituted divalent aromatic hydrocarbon radical having about 6 to about 20 carbon atoms, a straight or branched chain alkylene radical having about 2 to about 20 carbon atoms, a cycloalkylene radical having about 3 to about 20 carbon atoms, or a divalent radicals of the general formula (XIX)


(XIX)
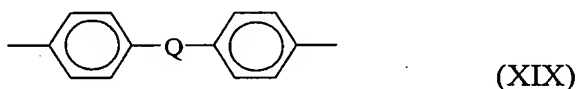
wherein Q includes a divalent moiety selected from the group consisting of -O-, -S-, -C(O)-, -SO$_2$-, -SO-, -C$_y$H$_{2y}$- or its halogenated derivatives an y is about 1 to about 5.

15.   The method of Claim 14, wherein the tetravalent linker comprises aromatic radicals of formula (XVII),
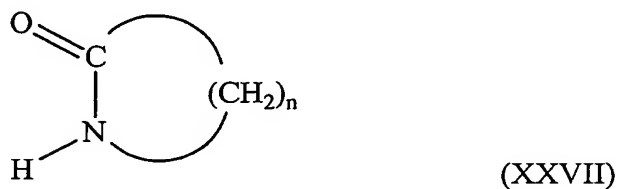

(XVII)
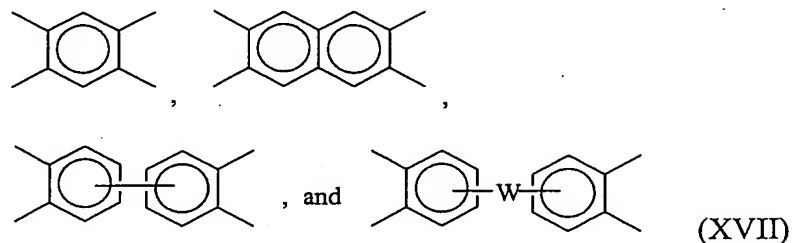
wherein W is -O-, -S-, -C(O)-, -SO$_2$-, -SO-, -C$_y$H$_{2y}$- or halogenated derivatives thereof, wherein y is from 1 to 5, or a group of the formula -O-Z-O- wherein the divalent bonds of the -O- or the -O-Z-O- group are in the 3,3', 3,4', 4,3', or the 4,4' positions, and wherein Z is a divalent radical of formula (XVIII)
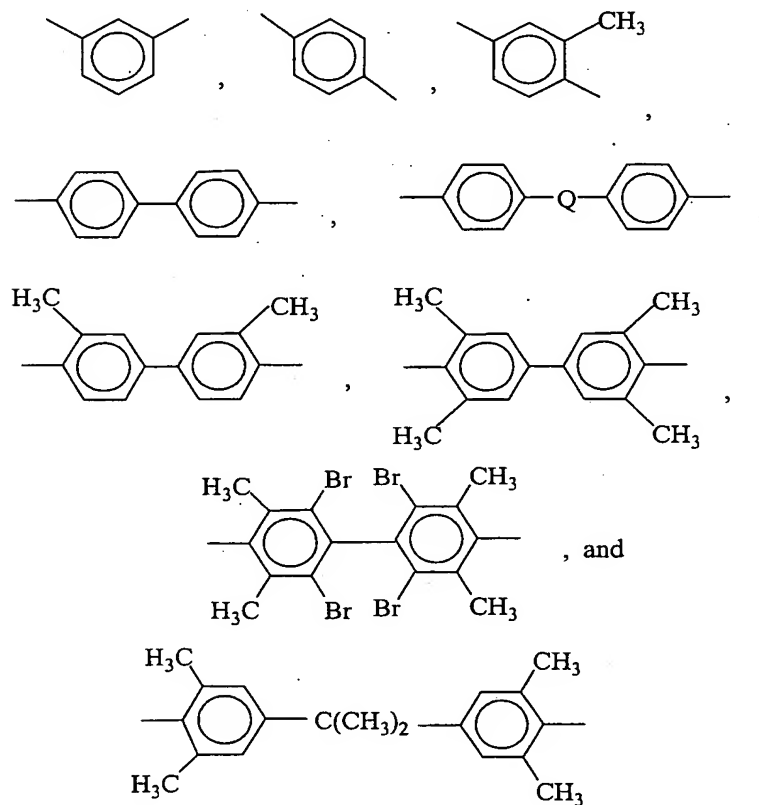
(XVIII)

16.   The method of Claim 1, wherein the organic polymer is a polyamide that is the polymerization product of organic lactams represented by the formula (XXVII)

$$O=C-(CH_2)_n$$ (ring structure with $N-H$)

(XXVII)

wherein n is about 3 to about 11and amino acids represented by the formula (XXVIII)

$$H_2N-(CH_2)_n-\overset{\overset{\displaystyle O}{\|}}{C}-OH$$ (XXVIII)

wherein n is about 3 to about 11.

17.   The method of Claim 1, wherein the organic polymer is a polyamide

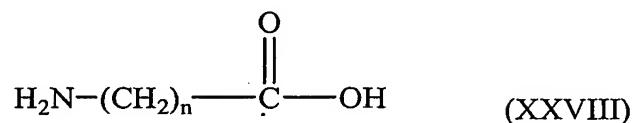that is the polymerization product of aliphatic dicarboxylic acids having from 4 to 12 carbon atoms and aliphatic diamines having from 2 to 12 carbon atoms.

18.   The method of Claim 1, wherein the organic polymer is a polyamide that is the polymerization product of a first polyamide with a second polyamide; wherein the first polyamide comprises repeating units having formula (XXX)
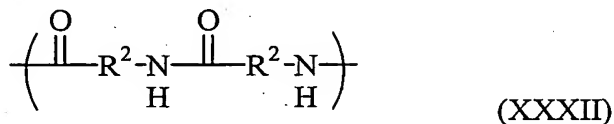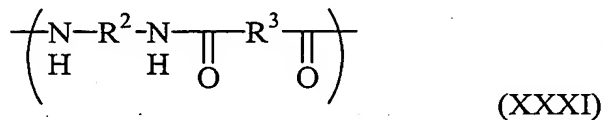
$$\left(\text{N}-\text{R}^1-\text{N}-\underset{\text{O}}{\overset{\text{O}}{\text{C}}}-\text{C}_6\text{H}_4-\underset{\text{O}}{\overset{\text{O}}{\text{C}}}\right)$$

(XXX)
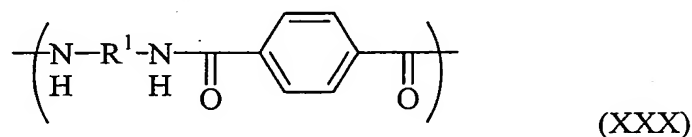
wherein R^1 is a branched or unbranched alkyl group having nine carbons; and wherein the second polyamide comprises repeating units having formula (XXXI) and/or formula (XXXII)

$$\left(\text{N}-\text{R}^2-\text{N}-\underset{\text{O}}{\overset{\text{O}}{\text{C}}}-\text{R}^3-\underset{\text{O}}{\overset{\text{O}}{\text{C}}}\right)$$

(XXXI)

$$\left(\underset{\text{O}}{\overset{\text{O}}{\text{C}}}-\text{R}^2-\underset{\text{H}}{\text{N}}-\underset{\text{O}}{\overset{\text{O}}{\text{C}}}-\text{R}^2-\underset{\text{H}}{\text{N}}\right)$$

(XXXII)

wherein R^2 is a branched or unbranched alkyl group having four to seven carbons and R^3 is an aromatic group having six carbons or a branched or unbranched alkyl group having four to seven carbons.

19.   The method of Claim 1, wherein the polymer precursor is an ethylenically unsaturated monomer.

20.   The method of Claim 1, wherein the organic polymer is a polyacetal, a polyacrylic, a polyalkyd, a polyacrylate, a polycarbonate, a polystyrene, a polyester, a polyamide, a polyaramid, a polyamideimide, a polyarylate, a polyarylsulfone, a polyethersulfone, a polyphenylene sulfide, a polysulfone, a polyimide, a polyetherimide, a polytetrafluoroethylene, a polyetherketone, a polyether etherketone, a polyether ketone ketone, a polybenzoxazole, a polyoxadiazole, a polybenzothiazinophenothiazine, a polybenzothiazole, a polypyrazinoquinoxaline, a polypyromellitimide, a polyquinoxaline, a polybenzimidazole, a polyoxindole, a polyoxoisoindoline, a polydioxoisoindoline, a polytriazine, a polypyridazine, a polypiperazine, a polypyridine, a polypiperidine, a polytriazole, a polypyrazole, a polycarborane, a polyoxabicyclononane, a polydibenzofuran, a polyphthalide, a polyacetal, a polyanhydride, a polyvinyl ether, a polyvinyl thioether, a polyvinyl alcohol, a polyvinyl ketone, a polyvinyl halide, a polyvinyl nitrile, a polyvinyl ester, a polysulfonate, a polysulfide, a polythioester, a polysulfone, a polysulfonamide, a polyurea, a polyphosphazene, a polysilazane, or a combination comprising at least one of the foregoing thermoplastic polymers.

21.   The method of Claim 1, further comprising carbon nanotubes, wherein the carbon nanotubes are multiwall carbon nanotubes, vapor grown carbon fibers, or a combination comprising at least one of the foregoing types of carbon nanotubes.

22.   The method of Claim 1, wherein the single wall carbon nanotubes have an inherent electrical conductivity of about 10^4 Siemens/centimeter.

23.   The method of Claim 1, wherein the single wall carbon nanotube composition comprises single wall carbon nanotubes in the form of ropes prior to processing and wherein the composition comprises a single wall carbon nanotube network in three dimensions after processing.

24.   The method of Claim 1, wherein the single wall carbon nanotube composition comprises metallic carbon nanotubes, semi-conducting carbon nanotubes, or a combination comprising at least one of the foregoing single wall carbon nanotubes.

25.   The method of Claim 1, wherein the single wall carbon nanotube composition comprises about 1 to about 99 wt% metallic carbon nanotubes.

26.   The method of Claim 1, wherein the single wall carbon nanotube composition comprises about 1 to about 99 wt% semi-conducting carbon nanotubes.

27.   The method of Claim 1, wherein the single wall carbon nanotube composition comprises single wall carbon nanotubes, and wherein the single wall carbon nanotubes are armchair nanotubes, zigzag nanotubes, or a combination comprising at least one of the foregoing nanotubes.

28.   The method of Claim 1, wherein at least a portion of the single wall carbon nanotube composition is derivatized with functional groups.

29.   The method of Claim 1, wherein the single wall carbon nanotube composition comprises at least a portion of single wall carbon nanotubes derivatized with functional groups either on a side-wall or on a hemispherical end.

30.   The method of Claim 1, wherein the single wall carbon nanotube composition comprises at least a portion of single wall carbon nanotubes having no hemispherical ends attached thereto or have at least one hemispherical end attached thereto.

31.   The method of Claim 1, wherein the blending is accomplished through sonicating.

32.   The method of Claim 1, further comprising adding a solvent prior to sonication.

33.   The method of Claim 1, wherein the blending is accomplished in a solution comprising a solvent.

34.   The method of Claim 1, wherein the blending is accomplished in the melt.

35.   The method of Claim 1, wherein the composition is used as a masterbatch.

36.   The method of Claim 1, wherein the composition is further blended with additional organic polymer.

37.   The method of Claim 1, wherein the organic polymer is semi-crystalline or amorphous and has a molecular weight of about 100g/mole to about 1,000,000 g/mole.

38.   The method of Claim 1, wherein the blending involves the use of shear force, extensional force, compressive force, ultrasonic energy, electromagnetic energy, thermal energy or combinations comprising at least one of the foregoing forces and energies and is conducted in processing equipment wherein the aforementioned forces are exerted by a single screw, multiple screws, intermeshing co-rotating or counter rotating screws, non-intermeshing co-rotating or counter rotating screws, reciprocating screws, screws with pins, barrels with pins, screen packs, rolls, rams, helical rotors, baffles, ultrasonicator or combinations comprising at least one of the foregoing.

39.   The method of Claim 1, wherein the blending is conducted in a kettle, while the polymerization is conducted in a device having a single screw, multiple screws, intermeshing co-rotating or counter rotating screws, non-intermeshing co-rotating or counter rotating screws, reciprocating screws, screws with pins, screws with screens, barrels with pins, rolls, rams, helical rotors, baffles, or a combination comprising at least one of the foregoing.

40.   An article manufactured by the method of Claim 1.